Watershed: San Joaquin River Basin

Sampling Period: 2000-2005

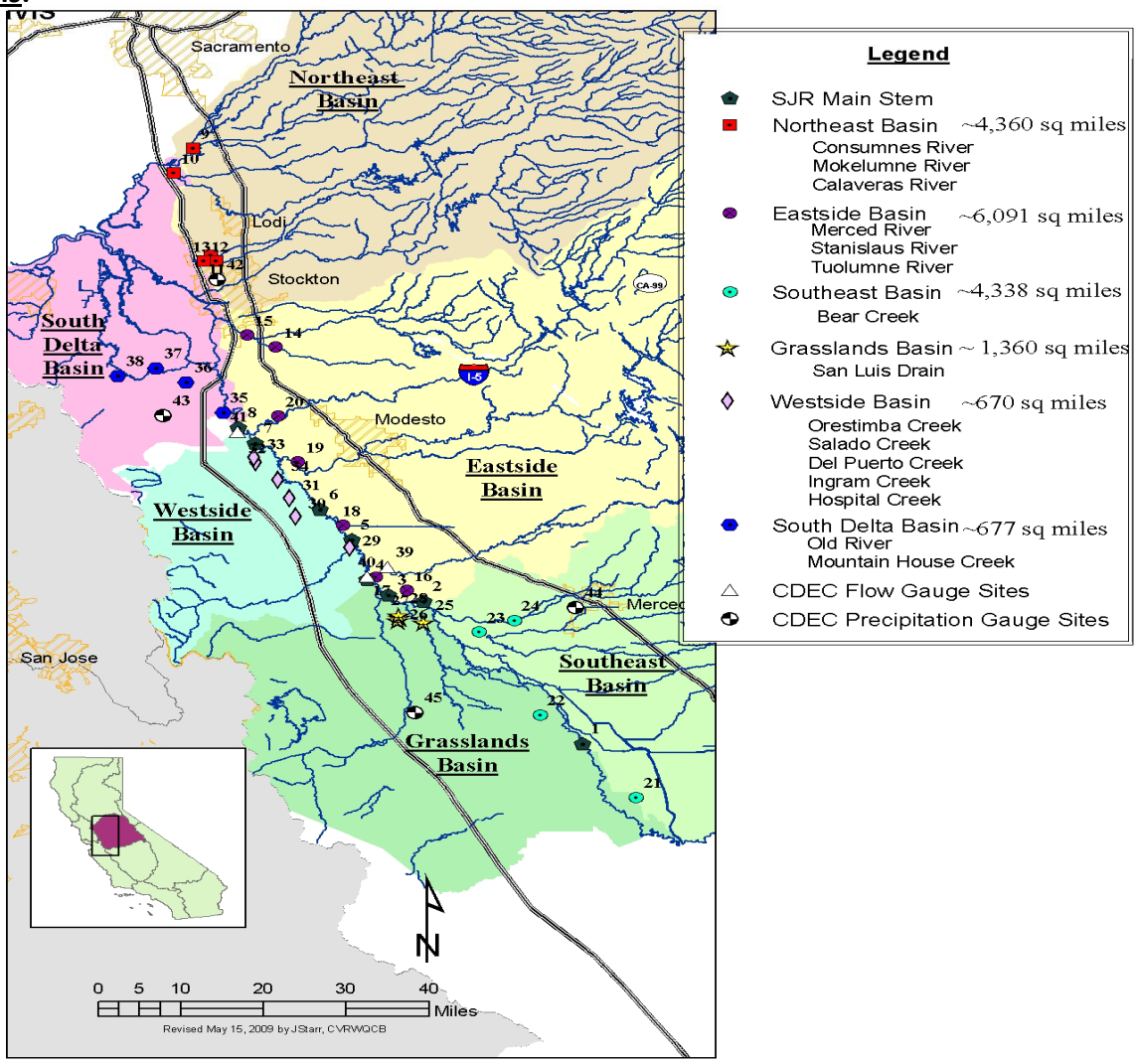
Report Objectives:
1. Spatial and Temporal Trends;
2. Potential Beneficial Use Concerns;
3. Planning for future monitoring program design.

MESSAGE: **Five years of water quality monitoring recorded both seasonal and annual trends in water quality that were influenced by different hydrologic regions (e.g. by sub-basins).**

KEY STATISTICS

Size of Watershed (square miles)	*17,720*
Number of Sites Sampled	*37*
Number of Constituents Measured	*32*
Number of Samples Collected	*~29,000*
Sample Frequency	*Weekly to Annually*

Site Locations:



Summary of Potential Beneficial Use Concerns: San Joaquin River and Sub-Basin Sites (2000-2005)

	San Joaquin River							Sub-Basins					
Beneficial Use/Indicator	**Sack Dam**	**Lander Ave**	**Fremont Ford**	**Crows Landing**	**Patterson**	**Maze**	**Airport**	**SE**	**Grassland**	**East**	**West**	**NE**	**S. Delta**
Drinking Water													
Specific Conductivity									NA				
Total Organic Carbon													
Trace Elements		T. Arsenic						T. Arsenic			[4]		
E. coli													
Nutrients[3]									Nitrate		Nitrate		Nitrate
Aquatic Life													
pH													
Temperature													
Dissolved Oxygen													
Turbidity	NA	NA	NA	NA	NA	NA	NA						
Trace Elements								T. Copper			T. Copper	[5]	
Minerals													
Water Column Toxicity	[7]		[1]			[2]							
Irrigation Water Supply													
Specific Conductivity													
Minerals													
Recreation (Swimming)													
E. coli													

=One or more result above a goal or objective

NA = There is no goal or objective applicable to the location

[1] Only had three samples taken with no toxic event found

[2] Only had one sample taken with no toxic event found

[3] Found for Nitrate only

[4] total arsenic, total chromium, total lead, total nickel and total mercury results were found above drinking water goals

[5] total and dissolved copper, total lead, and total zinc were found above aquatic life goals

[6] total and dissolved copper were found above aquatic life goals

[7] no samples were taken

WHAT IS THE REPORT SHOWING?

The large amount of data gathered over a five year period provides information on the spatial and temporal trends in water quality and preliminary indications on the potential beneficial use impacts on the San Joaquin River.

Spatial trends within the SJR show most constituents (SC, TSS, turbidity, metals, and minerals) concentrations tend to increase from Sack Dam to Hills Ferry, as a result of the Grassland Basin influences, and decrease from Hills Ferry down to Vernalis due to the Eastside Basin River sites contribution of high flow Sierra snow melt and reservoir storage flows balancing more saline flows from the Westside.

Strong seasonal trends were found for both temperature and dissolved oxygen (DO), with temperatures increasing in the summer and decreasing during the winter and (DO) demonstrating the opposite trend. Specific conductivity (SC), total organic carbon (TOC), turbidity, and total suspended solids (TSS) were influenced both by storm events, especially SC during the first storm runoff, and the irrigation season. Concentrations tended to spike during storm events, but remain at a lower but still elevated level during the irrigation season.

Table 1 identifies both indicators utilized and overall evaluation of potential beneficial use concerns. Temperature, SC (excluding Northeast Basin), TOC, and *E. coli* were some of major issues throughout the Basin.

WHY THIS INFORMATION IS IMPORTANT?

The San Joaquin River Watershed supports multiple beneficial uses (e.g. Drinking water, Aquatic life, Irrigation Water Supply and Recreation). Data collected as part of this study was assessed in combination with other available data during the development of the Clean Water Act Sections 305(b) and 303(d) Integrated Report for the Central Valley Region (CVRWQCB, 2009), which assessed overall water quality within the Central Valley of California and also identified impaired water bodies (water bodies not meeting their beneficial use designation). The findings within this report can also help determine future program design by focusing resources toward identified concerns.

WHAT FACTORS INFLUENCE THE FINDINGS?

Hydrology: The basin has been highly modified and regulated since the advent of the Central Valley Project in the late 1940's, with headwaters diverted into the Tulare Lake Basin, replacement flows diverted from the more saline Delta, and freshwater flows limited to controlled releases from eastside rivers draining the Sierra Nevada.
Land Use: Major land use along the San Joaquin Valley floor is dominated by irrigated agricultural, occupying approximately 2.0 million acres, representing approximately 23% of the irrigated acreage in California (DWR, 2001). Urban growth along the I-5 corridor between Fresno and Stockton is rapidly converting historical agricultural lands to urban areas leading to increasing potential for storm water and urban impacts to local waterways. Timber activities, grazing, abandoned mines, rural communities, and recreation can impact upper watershed areas (Graham, 2009).
Water Year Type: During the study period (2001 thru 2005) the San Joaquin Basin experienced three dry years, one below normal year and one wet year as defined by the San Joaquin River Index, described in the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (SWRCB, 1995).

TECHNICAL CONSIDERATIONS:

- Data source: Central Valley Water Board SWAMP web site at http://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_studies/surface_water_ambient_monitoring/index.shtml
- For selected constituents (e.g. water column toxicity, trace elements, turbidity, and nutrients) funding reductions prevented a continuous data set over the 5-yr sampling period
- Public report and fact sheet are available at: http://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_studies/surface_water_ambient_monitoring/swamp_water_quality_reports/index.shtml

REFERENCES:

1. DWR. 2001. Annual Land and Water Use Data: Irrigated Crop Area. State of California http://www.landwateruse.water.ca.gov/annualdata/landuse/2001/landuselevels.cfm . (Accessed: April 2, 2009)
2. Graham, C., 2009. *San Joaquin River Basin Rotational Sub-basin Monitoring: Consumnes, Mokelumne, and Calaveras River Watersheds, January – December 2002*. Regional Water Quality Control Board, Central Valley Region.
3. Central Valley Regional Water Quality Control Board (CVRWQCB). 2009. The 2008 Update to the 303(d) List and Development of the 2008 303(d)/305(b) Integrated Report. http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/impaired_waters_list/303d_list.shtml
4. State Water Resources Control Board (SWRCB). 1995. Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary. Quoted in Graham, 2009